J.13 GUIDELINES FOR SOFTWARE DEVELOPMENT PLAN (SDP)

This information is expected to be present regardless of the Contractor's choice of SDP format. This document is broken down into two (2) parts: 1) Guidelines for use of a Software Development Plan and 2) Contractor's Guidelines for a Software Development Plan. The first is for use by the IRS to provide guidance in using a SDP provided by the Contractor. The second provides guidance to the Contractors on what the IRS will be looking for in their SDP.

J.13.1 IRS GUIDELINES FOR USE OF A SOFTWARE DEVELOPMENT PLAN (SDP)

J.13.1.1 INTRODUCTION

The Software Development Plan (SDP) describes a developer's plans for conducting a software development effort. The term "software development" is meant to include new development, modification, reuse, reengineering, maintenance, and all other activities resulting in software products.

J.13.1.1.1 PURPOSE OF THE SDP

The SDP provides the IRS insight into, and a tool for monitoring, the processes the Contractor follows for software development, the methods to be used, the approach to be followed for each activity, and project schedules, organization, and resources. The SDP defines software management processes to be followed and the responsibilities, standards, procedures, and organizational relationships for all software activities associated with the task. It explains how the Contractor will adhere to the IRS management, engineering, and assurance requirements for Contractors of software. It is expected that, by requesting and managing the Contractor by an SDP, the IRS will have a better understanding of the Contractor's processes for performing the desired software development task.

The SDP outline presented in Section J.13.2.1 should be used as a guideline by the Contracting Officer's Technical Representative (COTR) for tailoring a request for an SDP that is specific to the tasks described by the statement of work (SOW). To this end, these guidelines should be familiar to the Organizational Coordinator (OC), the IRS project management requesting the work to be done, the Lead COTR (Lead COTR), and the Task Coordinator as well as the COTR responsible for drafting and managing the applicable SOW.

J.13.1.1.2 WHEN TO USE A SDP

Where possible, the Contractor should include an SDP with the proposal. As such, it may not be possible for the Contractor to provide a complete response to the SOW in only five days, depending on the complexity of the software development effort requested. Consideration should be given to extending the Contractor response time since an accurate estimate of the Contractor's effort requires knowledge of the type of information found in the SDP. The Contractor should maintain the SDP throughout the software life cycle by incorporating those changes resulting from milestone reviews and risk abatement decisions. Revisions to the SDP are to be presented by the Contractor during the next formal review. Only when the IRS has defined and documented functional requirements for the software development effort can the Contractor include an SDP in their proposal.

Where functional requirements have not yet been defined and documented, the Contractor should submit an SDP at the orientation briefing. If definition of the software development effort is requested in the same SOW, for example, the Contractor will not likely be able to develop a specific SDP for the development effort requested. Revisions to the SDP are to be presented by the Contractor during the next formal review.

J.13.2 CONTRACTOR GUIDELINES FOR A SOFTWARE DEVELOPMENT PLAN (SDP)

J.13.2.1 CONTENT OF THE SDP

The Contractor’s SDP should be tailored to reflect the constraints and responsibilities of the overall IRS project for which the task described by the IRS SOW contributes, such as the chosen software development methodology. The level of detail provided by the plan should be consistent with the level of effort expended on the job. A multi-million dollar, several year development effort warrants a very detailed, expansive SDP. The SDP for a three-month, one-person effort should be considerably less lengthy.

The following paragraphs describe a generic outline that can be used to solicit the information the IRS requires in a Contractor’s SDP, as necessary for CMMI® Level 2. This outline requests the basic types of information that should be represented in an SDP and should be tailored to fit the chosen software development methodology. The italicized words below represent elements of the SDP, as given to the Contractor in the SOW, that are expected to be present regardless of the Contractors choice of SDP format. The remaining text describes the information that is requested.

Note: The discussion below refers to software development practices that would be performed by the Contractor as specified in SOW and should not be confused with software development activities performed by internal IRS software development organizations.

INTRODUCTION

- Background - Describe the IRS project and the role of the software to be developed according to this SDP.

- Scope -Present the scope of the SDP as it relates to the associated Statement of Work (SOW.)

This information is usually stated in the SOW. It is requested here to confirm that the Contractor has a clear understanding of the effort.

PROJECT MANAGEMENT

- Software Development Organization - Provide a description of the Contractor's organization that will accomplish this task. Describe internal interfaces, especially interfaces among development, test, and QA, as well as points of contact with the IRS.

- Contractor's software activities should be organized and structured such that their management interfaces with the IRS project, hardware and service Contractors, and one another are appropriate in kind and scope of authority.

  In order to interface with the Project organization and to carry out the responsibilities of developing software, the Contractor organization should designate:

  - A qualified software specialist to act as its highest level Software Manager (SM) for all software development functions related to this task. The Contractor's SM should be responsible for planning and directing all aspects of software developments, acquisitions, subcontracting, products and services. The SM should be identified in the Contractor's Software Management Plan by name, title and organizational placement. Should the Contractor choose to further delegate responsibilities, lower level managers should report to the Contractor's SM and they should also be identified in the SDP.

  - A qualified software specialist to act as Software Assurance Manager (SAM) for all software activities related to this task. The SAM should have a

reporting channel to management of the Contractor's organization that is independent of the Contractor's Project management and software development function.

- A Configuration Management Officer to manage and direct the Contractor's configuration management process.
- An Independent Software Test Group (ISTG) for all software testing except unit level development testing. Although the ISTG should not include persons involved in the development of the software; members of the development activity may participate in testing in a supporting role.

- Subcontracting Plan - Show how the Contractor uses this SDP to manage subcontractors, where applicable.

- Metrics - Explain the techniques that the Contractor applies to determine the effort, resources, time, and cost required for various elements of the task. Explain the use of metrics in managing the task.

  Each software Contractor should indicate a consistent and repeatable methodology that will be used to develop, allocate, analyze, and revise, when requested by the IRS, software development staff hours, skill mix, and schedule estimates. The Contractor's SDP should document the methodology and parameters used to produce the estimates contained in their development plans. If the Contractor's estimating models and planning criteria are industry standards or are commonly used and well documented in the technical literature, Contractors need only identify them. If the estimating models and planning criteria used are unique or proprietary, they must be described in sufficient detail to enable the IRS to emulate them and to authenticate that emulation using the Contractor's parameters.

  The Contractor should establish and use a procedure for quantitatively measuring and reporting software development progress. The program should consist of three elements: (1) a scheme which assigns numerical progress values (NPVs) to development achievements, (2) a set of procedures for awarding value to products, and (3) mechanisms for documenting and tracking the quantitative status of each software component. The quantitative progress assessment program and its component elements should be completely defined within the Contractor's SDP. The Contractor's procedures for awarding NPVs to products should be based on documents that record the results of inspections, reviews, audits, tests and reports.

- Reporting - Explain how and at what intervals the Contractor measures progress and reports progress to the IRS.

The Contractor should present the IRS with at least planning period status reports to show measured progress against the plan. Reports should be jointly reviewed by the Contractor and IRS project managers. Problems should be reported in monthly status reports and tracked until resolved. Staff changes and deviations from the resource plan should be included in monthly reports.

At each milestone described in the schedule and at each monthly status review, the Contractor should address the current status of the Contractor's software accomplishments. The review should present accomplishments as measured by the Contractor's earned value system in light of planned and actual expended staff-hours, available resources, and schedules. If the actual NPV, resource profile, or schedule are more than fifteen percent (15%) out of line with those established by the SDP for the current point in the development process, the Contractor's presentation should show how schedule and/or resource shortfalls are to be recovered. The software Contractor should provide new estimates of cost and schedule to complete for Project review and approval. The accepted estimates should be used for assessment during the next phase of development.

Software Requirements

- Purpose and Description - Provide a top-level narrative description of the software and its primary functions.

- Allocated Requirements - List the system requirements to be satisfied by the software as presented in the SOW or accompanying design documents. This section may reference other documents.

Technical Approach

- Methodology - Explain how the Contractor plans to accomplish the development effort. Include specific development techniques, required software and hardware tools, and the use of non-development software.

To facilitate cost-effective development and support of deliverable software, the Contractor is encouraged to perform a cost/benefit analysis in determining whether to incorporate non-developmental software (NDS) into the software design. NDS may include commercially available (COTS) software, Government-furnished software (GFS), public domain software, and proprietary software. The Contractor should identify all NDS that will be used.

- Procedures and Standards - Explain how the Contractor addresses the following, particularly in accordance with the IRS standards cited in the SOW:

    - Software Life-Cycle

    Proposed adaptations to the IRS Life Cycle as described in IRM 2361, such as development by builds, incremental development and/or phased delivery should be described in the Contractor's SDP. In proposing any adaptation, the Contractor should describe the reviews and their relationships to the life cycle phases, and the baselines to be struck at the completion of the reviews.

    - Quality Assurance

    A Software Quality Assurance (SQA) program is a planned and systematic approach to the evaluation of the quality of and adherence to software product standards, processes, and procedures. SQA includes the process of assuring that standards and procedures are established and are followed throughout the software acquisition life cycle. Compliance with agreed-upon standards and procedures is evaluated through process monitoring, product evaluation, and audits. Software development and control processes should include approval points. At these points, an SQA evaluation of the product should be performed in relation to applicable standards.

    - Configuration Management

    Software Configuration Management (SCM) is the discipline of identifying the configuration of software at discrete points in time and systematically controlling changes to the identified configuration for the purpose of maintaining software integrity and traceability throughout the software life cycle. In order to accomplish the objective given in the above definition, the Contractor should implement four SCM functions and document them in the SDP:

        - Configuration Identification: Identification of the components that make up the software system and definition of its functional characteristics

        - Configuration Control: Control of changes to those components

        - Configuration Status Accounting: Reporting of status of the processing of change requests and their implementation status

- Configuration Authentication: Audits to authenticate that the controlled items meet their requirements and are ready for delivery.

- Risk Management

An organized software risk management program provides a systematic assessment and control of potential safety, security, technical performance, cost, and schedule risks associated with the development and operational use of Project software. The Contractor's risk management program should be documented in the SDP.

- Testing and Acceptance Criteria

Formal reviews at the end of each life cycle phase include the Software Requirements Review, the Software Preliminary Design Review, the Software Critical Design Review, and the Software Test Readiness Review. These reviews should encompass the items to be included in the configuration management baselines to be established after the successful completion of the review.

The IRS and Contractor should establish a nonconformance or problem reporting and corrective action procedure (NRCA), which should provide for the recording of nonconformance, the evaluation of impact and establishing of priority, the tracking and reporting of status, and the closure after testing. A nonconformance should be defined as a deviation of any product from its requirements or standards. QA Problem Definition forms should be filed against any product in any phase of the software life cycle after a product is first approved or baselined by its developer and released for wider use. The NRCA procedure should interface with the CM system in order to track the product changes and versions that result from correcting nonconformance.

- Security and Privacy Assurance Planning

The IRS may conduct a security assessment process by considering and categorizing the sensitive information that is to be managed and controlled by the software to be developed. The information, including both programs and data, should be categorized according to its sensitivity. Based on the categorization, the Contractor should develop security requirements. The security requirements should encompass system access control, including network access and physical access; data management and data access; environmental controls (power, air conditioning, etc.) and off-line storage; human resource security; and audit trails and usage records.

Schedule

- Work Breakdown Structure - Provide a Work Breakdown Structure (WBS) as a framework for staffing and managing the software development effort.

  The WBS is used in the process of preparing cost estimates. Where needed, the Contractor should add and define sub-activities. The sub-activities and the cost accounts definitions should be used as part of the cost estimation process and supplied to the IRS as required in procurement documents. If this information is provided in the proposal it need not be repeated in the Contractor's SDP.

- Schedule
  - *Provide a detailed graphical schedule(s) that includes, at a minimum: task deliverables*
  - *interim milestones for tracking deliverables on a monthly basis*
  - *start and stop dates for all activities at the lowest level of the Work Breakdown Structure (WBS) described in the proposal*
  - *all milestones identified in the software life-cycle and QA Plan*
  - *all project reviews, including monthly status reviews*

  The Master Schedule, generated by the Contractor for all phases of development, should concur with the specific IRS deliverables and milestones presented by the IRS in the SOW. The Contractor's software development schedule should include all applicable life cycle milestone events.

  Contractors should maintain a hierarchical set of software schedules that are consistent with the WBS and the Master Schedule. The Contractor's schedules should show the activities and events broken down by two-week intervals. Changes in the hierarchical schedules that impact the Master Schedule should be included in the Contractor's monthly management reports. Proposed changes that impact the Master Schedule should be submitted for IRS review and approval before changes to the Master Scheduled are made. Revised Contractor schedules that include a Master Schedule change should be delivered to the IRS.

Resources

- Staffing - List the number and types of personnel required during each phase of the development.

- Equipment - List all equipment required to support the development of Project software, including requirements for a Software Support Environment (SSE) that includes CASE tools.

- Materials and Facilities - List and describe all materials, facilities, and other resources, including the software portions of the SSE, required to support the development of the Project software.

- Non-development Software - Identify the COTS and GFE software that the Contractor will use on this task and explain the specific benefits and risks that will arise.

- Other - Describe any resource requirements not listed above.

The information provided in this section is very specific to the software effort and not usually addressed by the SOW.